

الف) $1 - 2\sin^2 n = 2\sin n - 1 \rightarrow 2\sin^2 n - 2\sin n + 1 = 0 \rightarrow \sin n = \frac{1}{2} \alpha$
 $\rightarrow \sin n = \sin \frac{\pi}{6} \rightarrow \begin{cases} n = 2k\pi + \frac{\pi}{6} \\ n = 2k\pi + \pi - \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \end{cases}$

ب) $2\cos^2 n - 1 + \cos n - 2 = 0 \rightarrow 2\cos^2 n + \cos n - 3 = 0 \rightarrow \cos n = \frac{1}{2} \alpha$
 $n = 2k\pi$

الف) $(\sin^2 n + \cos^2 n)(\sin^2 n - \cos^2 n) = \sin^2 n = 2\sin^2 n \cos^2 n \rightarrow \sin^2 n = -\frac{1}{2}$
 $\Rightarrow \begin{cases} 2n = 2k\pi + \frac{\pi}{2} \rightarrow n = k\pi + \frac{\pi}{4} \\ 2n = 2k\pi + \pi - \frac{\pi}{2} \rightarrow n = k\pi - \frac{\pi}{4} \end{cases}$ $\cos 2n = 0 \rightarrow n = \frac{k\pi}{2} + \frac{\pi}{4}$

ب) $2\cos^2 n + \sin^2 n = 1 \rightarrow 2\cos^2 n - 1 = -\sin^2 n = \cos^2 n \rightarrow \sin^2 n + \cos^2 n = 0$
 $\rightarrow \tan^2 n + 1 = 0 \rightarrow \tan^2 n = -1 = \tan^2(-\frac{\pi}{4}) \rightarrow n = k\pi - \frac{\pi}{4} \rightarrow n \neq \frac{k\pi}{2} - \frac{\pi}{4}$

الف) $\frac{2\cos^2 n + \cos n - 1}{\sin n} = 0 \xrightarrow{\sin n \neq 0} 2\cos^2 n + \cos n - 1 = 0 \rightarrow \cos n = \frac{1}{2} \alpha$
 $\rightarrow \cos n = \frac{1}{2} = \cos \frac{\pi}{3} \rightarrow n = 2k\pi \pm \frac{\pi}{3}$

ب) $2\sin^2 n - \sin n \cos n + (1 - \sin^2 n) = 2 \rightarrow \sin^2 n - \sin n \cos n - 1 = 0$
 $\rightarrow \tan^2 n - \tan n - \frac{1}{\cos^2 n} = 0 \xrightarrow{(1 + \tan^2 n)} (1 + \tan^2 n) = -\tan n - 1 \rightarrow \tan n = -1 = \tan(-\frac{\pi}{4})$
 $\rightarrow n = k\pi - \frac{\pi}{4}$

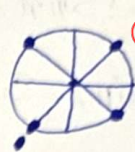
الف) $\cos(\frac{\pi}{4} + n) \cos(\frac{\pi}{4} - n) = \frac{1}{2} \sin(n + \frac{\pi}{4}) = \frac{1}{2} \cos n = \frac{1}{2} \rightarrow \cos n = \frac{1}{2}$
 $\sin(\frac{\pi}{4} + n) = \frac{1}{2} \rightarrow \cos n = \frac{1}{2} \rightarrow n = k\pi \pm \frac{\pi}{3}$

ب) $\cos(\frac{\pi}{4} - 2n) = \cos(2n - \frac{\pi}{4})$
 $\cos(\frac{\pi}{4} - 2n) = \cos(\frac{\pi}{4} + 2n) \rightarrow n = \frac{k\pi}{2} - \frac{\pi}{8}$

$\frac{2\sin^2 n \cos^2 n + \sin^2 n}{\sin^2 n} - \sin^2 n = 2\cos^2 n + 1 - \sin^2 n = 2\cos^2 n - 2 + \cos^2 n =$
 $= 2\cos^2 n - 2 = \cos^2 n \rightarrow 2\cos^2 n = 2 \rightarrow 2\cos^2 n - 1 = 0 \rightarrow \cos^2 n = 0 = \cos^2 \frac{\pi}{2}$
 $n = 2k\pi \pm \frac{\pi}{2} \rightarrow n = \frac{k\pi}{2} \pm \frac{\pi}{2}$

$$\frac{x \sin \frac{\pi}{4} \cos \frac{\pi}{4}}{x \cos^2 \frac{\pi}{4}} = \tan \frac{\pi}{4} = \frac{1 + \cos \frac{\pi}{4}}{\sin \frac{\pi}{4}} = \frac{x \cos^2 \frac{\pi}{4}}{x \sin \frac{\pi}{4} \cos \frac{\pi}{4}} = \cot \frac{\pi}{4} = \frac{1}{\tan \frac{\pi}{4}}$$

$$\Rightarrow \tan \frac{\pi}{4} = \frac{1}{\tan \frac{\pi}{4}} \Rightarrow \tan^2 \frac{\pi}{4} = 1 \Rightarrow \tan \frac{\pi}{4} = \pm 1 \Rightarrow \begin{cases} \frac{\pi}{4} = k\pi + \frac{\pi}{4} \\ \frac{\pi}{4} = k\pi + \frac{3\pi}{4} \end{cases}$$



1

$$\left| \frac{\pi}{4} - \frac{3\pi}{4} - \frac{5\pi}{4} - \frac{7\pi}{4} - \frac{9\pi}{4} \right| = \frac{19\pi}{4}$$

$$k=0 \rightarrow \alpha = \pi \quad k=-1 \rightarrow \alpha = -\pi$$

$$|-1 - \pi| = k\pi$$

$$\cos^2 n - 1 = \sin^2 n \cos^2 n = -\sin^2 n \Rightarrow \cos^2 n = -1 = \cos \pi$$

$$n = k\pi \pm \pi \rightarrow n = \frac{k\pi}{2} \pm \frac{\pi}{2}$$

$$\sin \alpha = 0$$

$$\alpha = 0, \pi, 2\pi$$

$$\cos^2 n = 1$$

$$\alpha = \frac{\pi}{2}, \pi, \frac{3\pi}{2}$$



2

3

جواب 3

$$\frac{\tan \frac{\pi}{4} - \tan n}{1 + \tan \frac{\pi}{4} \tan n} = \frac{1 - \tan n}{1 + \tan n} = \tan \left(\frac{\pi}{4} - n \right) = \tan(\pi n) \rightarrow \pi n = k\pi + \frac{\pi}{4} - n$$

$$\rightarrow \pi n = k\pi + \frac{\pi}{4} \Rightarrow n = \frac{k\pi}{4} + \frac{\pi}{14}$$

5

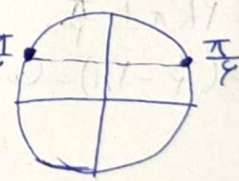
4

$$1 + \sin^2 n = 2 \cos^2 n = 1 + \cos^2 n \rightarrow \sin^2 n = \cos^2 n = 1 - \sin^2 n$$

$$\rightarrow 2 \sin^2 n + \sin^2 n - 1 = 0 \rightarrow \sin^2 n = \frac{1}{2} = \sin^2 \frac{\pi}{4}$$

$$\begin{cases} n = k\pi + \frac{\pi}{4} \\ n = k\pi - \frac{\pi}{4} + \pi \\ n = k\pi + \frac{3\pi}{4} \\ n = k\pi + \pi - \frac{\pi}{4} \end{cases}$$

$$\sin^2 n = -1 \rightarrow \begin{cases} \alpha = k\pi - \frac{\pi}{4} \rightarrow \frac{k\pi}{4} \\ \alpha = k\pi + \frac{\pi}{4} \rightarrow \frac{k\pi}{4} \end{cases}$$



10

5

$$\text{الف) } (\sin^2 n + \cos^2 n)(\sin^2 n - \cos^2 n) = -\cos^2 n = 1 \rightarrow \cos^2 n = -1 = \cos \pi$$

$$\rightarrow n = k\pi \pm \pi \rightarrow n = k\pi \pm \frac{\pi}{2} \rightarrow n = \frac{\pi}{2}, \frac{3\pi}{2}$$



$$\alpha = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\text{ب) } \frac{(\sin n - \cos n)(\sin^2 n + \cos^2 n + \sin n \cos n)}{\sqrt{2} \sin(n - \frac{\pi}{4})} = \frac{1 + \sin n \cos n}{\sqrt{2} \sin(n - \frac{\pi}{4})}$$



$$\alpha = 0, \pi, \frac{3\pi}{2}$$

70

5